

Part I: Read the questions carefully and select the best answer (out of 10): [1 point each]

1. TV and Radio broadcasting is an example of _____ data flow.

- ☒ a. Simplex.
- ☐ b. Full-duplex.
- ☐ c. Half-duplex.
- ☐ d. Security.
- ☐ e. Automatic.
- ☐ f. None of the above.

2. A _____ connection provides a dedicated link between two devices.

- ☐ a. Secondary.
- ☐ b. Primary.
- ☐ c. All-to-All.
- ☐ d. Multipoint.
- ☒ e. Point-to-point.
- ☐ f. Point-to-Multipoint.

3. UDP protocol is implemented at _____ layer.

- ☐ a. Physical.
- ☐ b. Data Link.
- ☐ c. Network.
- ☒ d. Transport.
- ☐ e. Session.
- ☐ f. Presentation.
- ☐ g. Application.

4. When a host on network A sends a message to a host on network B, which address does the router look at?

- ☐ a. Port address.
- ☒ b. Logical address.
- ☐ c. MAC address.
- ☐ d. Physical address.
- ☐ e. Both c and d.
- ☐ f. None of above.

5. The physical, data link, and network layers are the _____ support layers.

- ☐ a. User.
- ☒ b. Network.
- ☐ c. Both a and b.
- ☐ d. Neither a nor b.

6. Baseband transmission of a digital signal is possible only if we have a _____ channel.

- ☒ a. Low-pass.
- ☐ b. Band-pass.
- ☐ c. Broadband.
- ☐ d. Low-rate.
- ☐ e. High-rate.
- ☐ f. Band-stop.

7. _____ are complex switching stations which connect national ISPs.

- ☐ a. ARPA.
- ☐ b. ARPANETs.
- ☐ c. Networks.
- ☐ d. International ISPs.
- ☒ e. NAPs.
- ☐ f. Regional ISPs.

10

8. A periodic signal has a frequency of 1 GHz. The period (time) is _____
- ☐ a. 1 ms.
☐ b. 0.01 s.
☐ c. 1 μ s.
☒ d. 1 ns.
☐ e. 9.53 ms.
☐ f. 0.954 μ s.
☐ g. 0.954 s.
9. If the bandwidth of a non-periodic composite signal is 120 KHz and has a middle frequency of 100. The highest frequency is _____
- ☐ a. 12000 KHz.
☐ b. 240 KHz.
☐ c. 220 KHz.
☐ d. 170 KHz.
☒ e. 160 KHz.
☐ f. 40 KHz.
☐ g. 20 KHz.
☐ h. 1.2 KHz.
10. If a pixel consists of 5 bits, then it can represent _____ tonal levels.
- ☒ a. 2^5 .
☐ b. 2×5 .
☐ c. $2+5$.
☐ d. 5.
☐ e. 5^2 .
☐ f. 5×4 .
☐ g. $\frac{5 \times 4}{2}$.

Part II: Assign the following functions to one or more layers of the OSI model: (out of 10): [1 point each]

No.	Function	Layer
1	Encryption	Presentation
2	Mail services	Application
3	Changes bits into electromagnetic signals	Physical
4	Segmentation	Transport
5	Routing	Network
6	Port addressing	Transport
7	Translates and converts data into a known format such as ASCII, JPEG, and MPEG.	Presentation
8	Physical addressing	Data Link
9	Dialogue control	Session
10	Framing	Data Link

Part III: Fill the blank with suitable words/numbers. (out of 6): [1 point each]

1. A mesh topology is used to connect 8 devices, the number of cables required is 28 and the total number of ports needed is 56. (7 for each).
2. TCP/IP model has 5 layers.
3. The bit duration for a channel with a bit rate of 60 Kbps is 1.6×10^{-5} second.
4. If an image with a resolution of 3.2 Megapixels requires 51.2 Mega bits, then each pixel consists of 16 Bytes.
5. Ethernet uses 6 bytes physical address that is imprinted in the network interface card (NIC).

Part IV: Read the questions carefully then answer all the questions (out of 14):

1. Draw the composition signals shown in Figure (1) in the frequency-domain representation. [4 points]

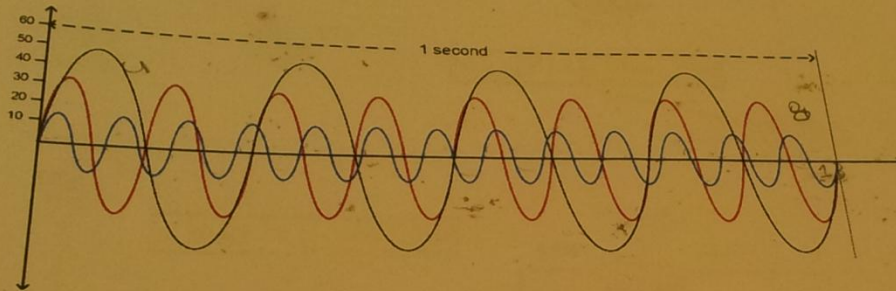
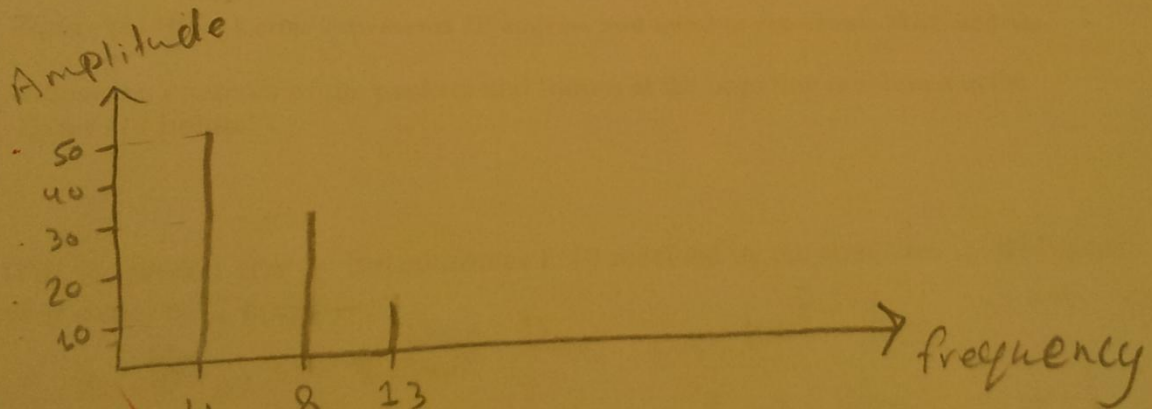


Figure (1)



A sine wave is offset $1/10$ cycle with respect to time 0 as shown in Figure (2). What is its phase in degrees and radians? [4 points]

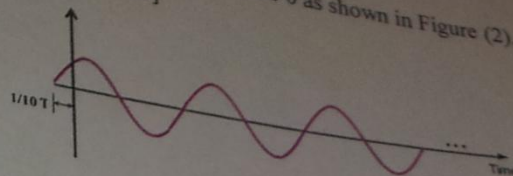


Figure (2)

- ✓ In degree = $\frac{1}{10} \times 360 = 36^\circ$
- ✓ In Radiance = $36 \times \frac{2\pi}{360} = 0.628 \text{ Rad}$

3. In the following Figure

3. In the following Figure (3)

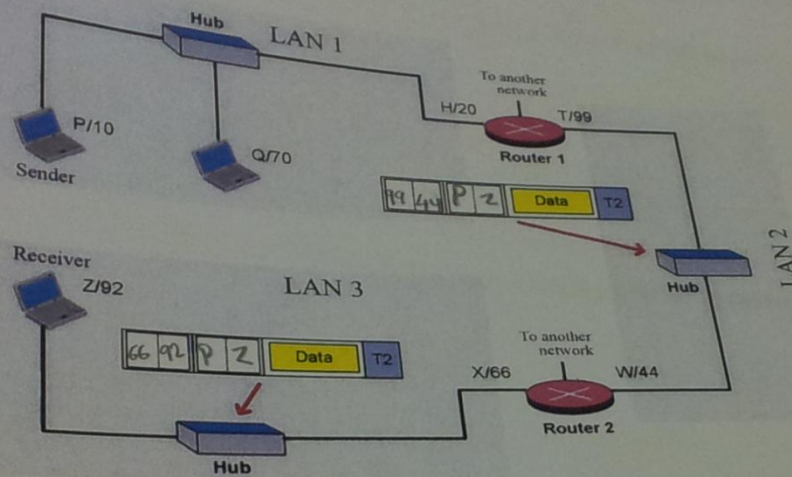


Figure (3) Hint: Letter represents IP address and number represents MAC address.

- i. Show the contents of the packets and frames at the hops that are shown in the figure. [4 points]
- ii. Will the packet sent by the computer P/10 received by the computer Q/70? Explain what happen. [2 points]

the packet to P/10, Q/20